Mathematics 6

For Class 6th

Balochistan Textbook Board, Quetta.

UNIT

13

INFORMATION HANDLING

UNIT OUTLINES

13.1: Types of Data
13.2: Bar Graph
13.3: Pie Graph

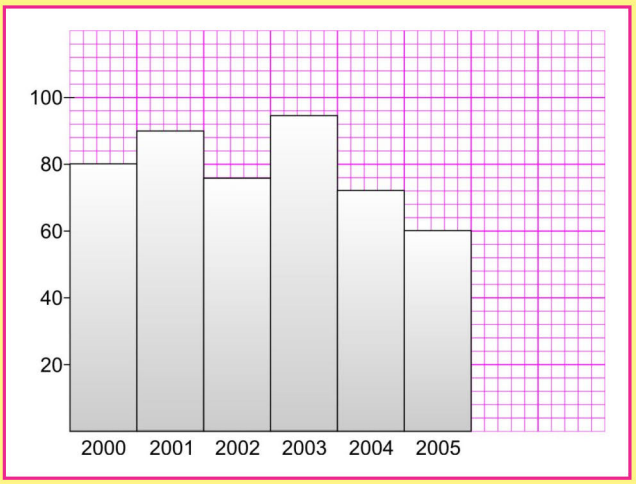
STUDENTS LEARNING OUTCOMES

After studying this unit, the students will be able to:

- Define data and data collection.
- Distinguish between grouped and ungrouped data.
- Draw horizontal and vertical bar graphs.
- Read a pie graph.

Introduction

Today we live in the information age where we understand great deal about the world. Much of this information is determined mathematically by using statistics. Statistics tells us about trends what happened in the past and can be useful in predicting what may happen in the future.



(Lots of times on the news reports, statistics about a disease are reported. For example, studies have shown that 85 to 95 percent of lung cancers are smoking related).

Information Handling

Data is actually information that we can get from different sources and use it purposefully.

For example, the information of the population of a country, the birth and death rate in a country, number of schools and of Hospitals in a country. Such kind of information or data help in planning different welfare aspects of a country.

Collection of data organizing presenting and trying conclusion from data is known as information handling. It is also known as statistics.

13.1 Types of Data

13.1.1 Data

Data is the numerical figures obtained from any source e.g. office records, published papers, newspapers, media and so on. Data can also be obtained directly from the files according to the needs e.g. we can count the

vehicles that pass through a particular point and such data is commonly known as information.

Data Collection

Before starting any program, the first step is the collection of facts and figures. The process is known as data collection. A person who collects data is called investigator. The investigator can collect the data himself or herself use the data collected by some one else.

> ***Do you know!***
> Piece of information is also called data.

There are two types of data:

(i) Primary Data

(ii) Secondary Data

i) Primary Data

The data directly collected from its source is called primary data. As we count the number of vehicles passing through a particular point and time. In this case, the number of vehicles is called primary data.

> ***Do you know!***
> First hand information is also called primary data.

ii) Secondary Data

The data collected originally by someone else and used by others is called secondary data. We can say that the data that passed through some statistical process at least once is called secondary data e.g. We counted 586 vehicles primarily passed through a particular point and time. Now, we put them in the order of cars, buses, motor bikes and trucks. We concluded that 200 cars, 56 buses, 300 motor bikes and 30 trucks passed through that particular point and time.

Such that data is called secondary data.

13.1.2 Distinguish Between Grouped and Ungrouped Data

Marks obtained by 20 students in a mathematics test out of 50 are;

18, 17, 26, 38, 9, 36, 40, 18,
19, 17, 9, 40, 26, 29, 18, 35,
18, 25, 26, 18

Numerical facts in the above data are in raw form. Therefore, any data which is obtained from the first hand is called ungrouped data..

We have seen that the above data in its given form is discrete i.e. without any grouping. If the data have gone through some statistical process, it may be classified into certain groups or into rows and columns.

The above data can be presented in different ways in rows and columns. Therefore presentation of raw data into some order with the help of rows and columns is known as grouped data.

Mathematics Test

Marks obtained	09	17	18	19	25	26	29	35	36	38	40
No. of Students	02	02	05	01	01	03	01	01	01	01	02

Similarly, the above mentioned data can be presented into certain groups as given below:

Marks obtained	0 - 10	11-20	21 - 30	31 - 40	41 - 50
No. of Students	02	08	05	05	Nil

The above mentioned table is a frequency table. It tells how many times each piece of data occurs in a set of information and No. of students is called frequency. Both ways of data presentation is known as grouped data.

13.2 Bar Graph

In bar graph, data is displayed by bars horizontally and vertically. These bars show the relationship between different variables and quantities. Consider the following examples:

Remember

Frequency is always taken along the y-axis and variables along the x-axis.

Example

100 students of class 6th were asked how many hours they spent in studying mathematics in a week. The below frequency table shows the result.

Hours Spent	1 - 3	4 - 6	7 - 9	10 - 12	13 - 15	16 - 18
No. of Students	8	16	6	20	26	24

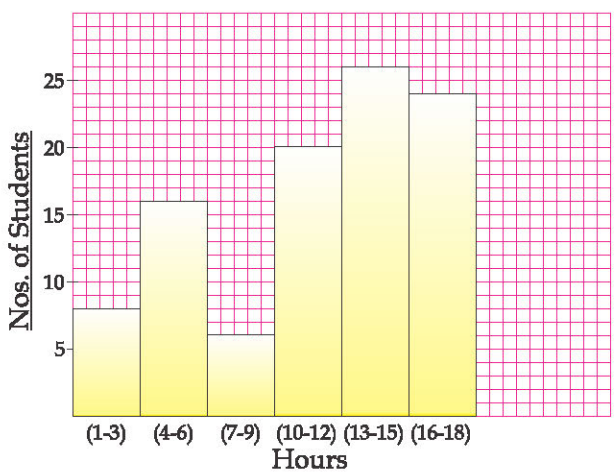
Make a bar graph to show the above data.

Solution

(i) Select an appropriate scale to draw a bar graph.
Scale: 1 large division represents 5 students along y-axis.

(ii) Draw x-axis and y-axis.

(iii) Indicate No. of students according to the scale along y-axis.



(iv) Draw coloured rectangular bars according to the scale for hours.

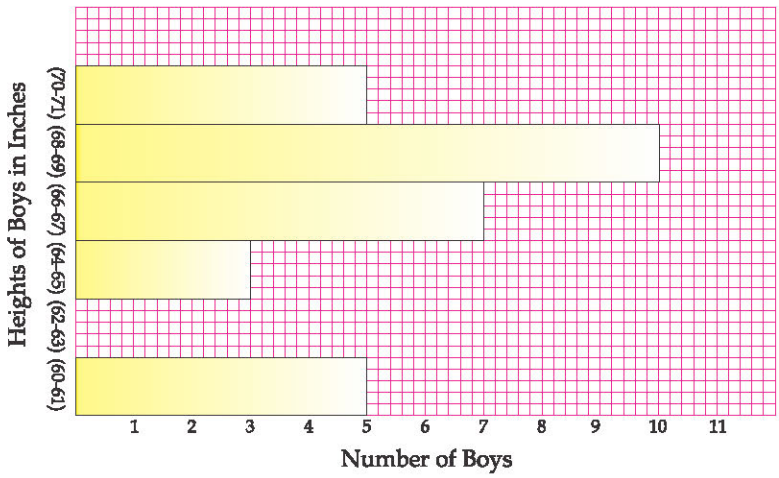
Example

Make a horizontal bar graph of the data given below.

Heights in Inches	60-61	62-63	64-65	66-67	68-69	70-71
No. of Students	5	0	3	7	10	5

Solution

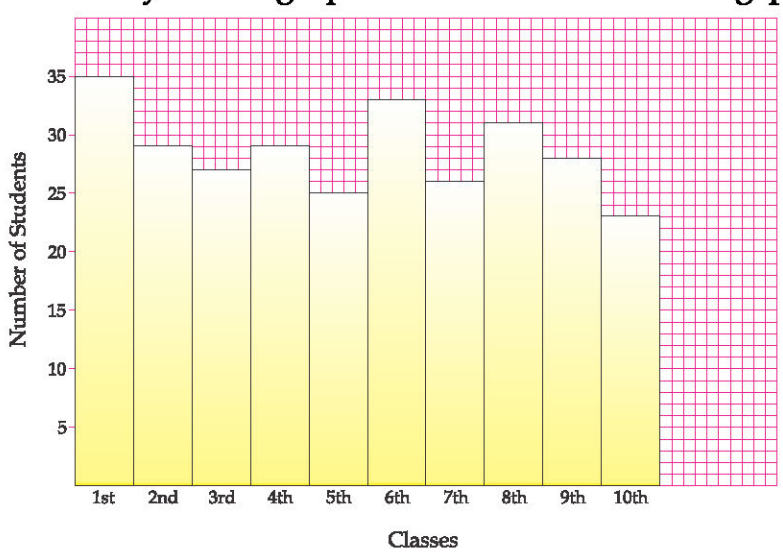
We have to make a bar graph horizontally, so we will take the height of the boys at vertically while the number of boys at horizontally.
Let one big square = One Boy



(i) Select an appropriate scale to draw horizontal bar.
Scale: 1 large division requests 1 student along graph x-axis.
(ii) Draw x-axis and y-axis.
(iii) Draw coloured rectangular bars according to the scale for height.

Example

Bar Graph given below shows the number of students in ten classes in a high school. Study the bar graph and answer the following questions.



(i) In which class the strength is highest?
(ii) In which class the strength is lowest?
(iii) In which classes the number of students are equal?
(iv) What is the strength of students in 6^{th} class?
(v) what is the strength of students in 9^{th} class?
(vi) How many students are more in class one than 4^{th} class?
(vii) How many students are less in 7^{th} class than 6^{th} class?
(viii) what is the total strength of students in the high school?

Solution

(i) Class One, (ii) 10^{th} Class,
(iii) 2^{nd} and 4^{th} Class, (iv) 33,
(v) 28 (vi) 6 Students,
(vii) 7 Students, (viii) 286

13.3 Pie Graph

A pie graph is used to compare parts of a whole. We can say that pie graph is helpful for us when we want to show different parts of certain quantities but not the full. In pie graph, we make a circle and its different sectors to show the different quantities. Pie graph is also called as circle graph.

How to use it

Find the total value for the entire category being studied and calculate the percentage for each segment or part.

To Calculate Degree

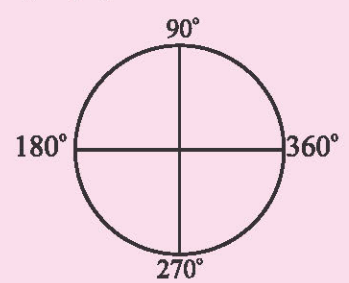
Convert the percentage values for each segment into degrees relative to 360° in the circle.

For example

$30\% \times 360 = 108$ degree

Do you know!

A pie graph has 360°.



Example

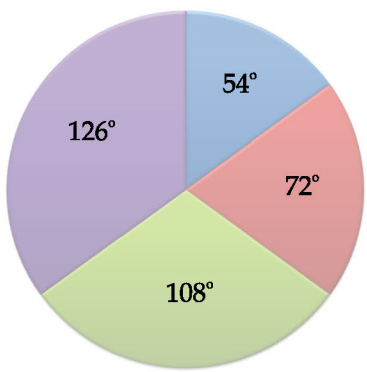
Draw a pie graph for the expenses of a new product with following instructions.

Project management	= 20%
Technical support	= 15%
Development	= 30%
Research	= 35%

Solution

We convert them into degree

Project management	= 20% × 360 = 72 degree
Technical support	= 15% × 360 = 54 degree
Development	= 30% × 360 = 108 degree
Research	= 35% × 360 = 126 degree



Example

A family's monthly expenditure on education, food and fuel is as follows:

Expenses	Rupees
Education	Rs. 5000
Food	Rs. 10000
Fuel	Rs. 2000

Draw a pie graph to display the information.

Solution

Total monthly expenditure $= 5000 + 10000 + 2000$

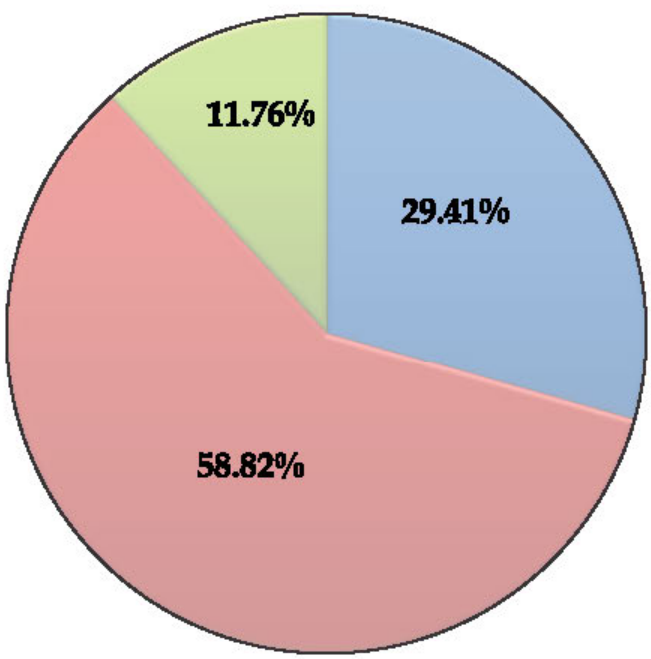
$= \text{Rs.}17000$

Percentage of monthly expenditure is

$$\text{Education} = \frac{5000}{17000} \times 100\% = 29.41\%$$

$$\text{Food} = \frac{10000}{17000} \times 100\% = 58.82\%$$

$$\text{Fuel} = \frac{2000}{17000} \times 100\% = 11.76\%$$



EXERCISE 13.1

Q1: Define data and data collection?

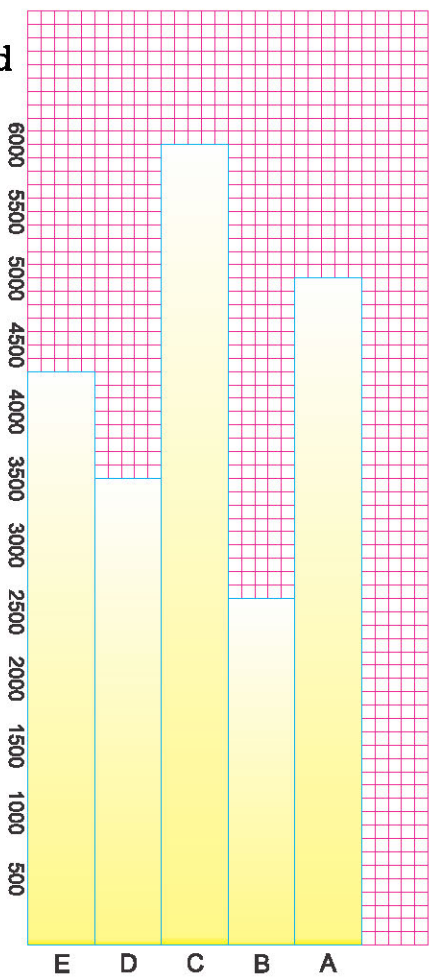
Q2: Differentiate between grouped and ungrouped data?

Q3: Following are the marks obtained by 25 students of 6th class in final examination 2013.

436, 589, 473, 679, 478, 539, 624, 358, 412, 539, 666, 527, 449, 603, 638, 498, 613, 480, 398, 546, 308, 554, 567, 494, 631

Make a grouped data by using the above mentioned data.

Q4: The bar graph below shows the sale of petrol of five petrol pumps A, B, C, D and E.



Study the above bar graph carefully and answer the following questions.

i) At which petrol pump is the sale of petrol highest?

ii) What is the sale of petrol on petrol pump A?

iii) At which petrol pump is the sale of petrol lowest?

iv) At which petrol pump the sale of petrol is 2600 liters?

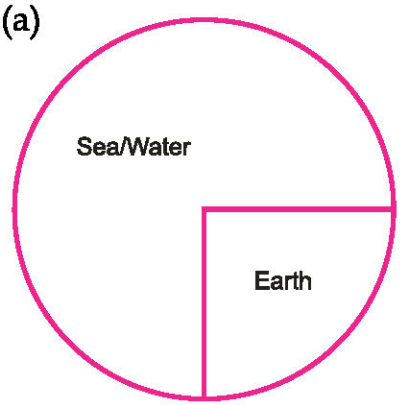
v) Find the total sale of petrol of petrol pump B and D?

Q5: The following table is the classification of marks obtained in a mathematics test by 100 students out of a total of 100 marks. Draw a bar graph to show the frequency table given below.

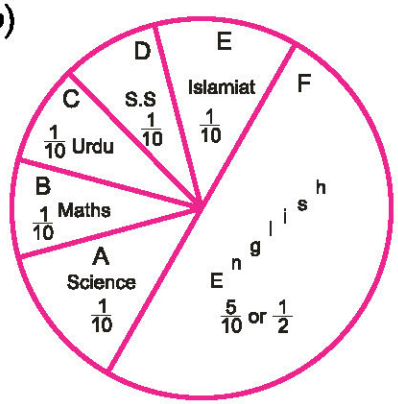
Marks	Frequency
0 – 10	0
11 – 20	02
21 – 30	07
31 – 40	14
41 – 50	27
51 – 60	18
61 – 70	09
71 – 80	17
81 – 90	05
91 – 100	01
Total:	100

Q6: Read the following Pie/Circle graphs:

(a)



(b)



REVIEW EXERCISE 13

Q1. Choose the correct one.

i) Statistics is the branch of:

(a) Mathematics (b) Geometry

(c) Computer (d) Algebraic

ii) The data collected for the first time is called:

(a) Secondary data (b) Primary data

(c) Qualitative data (d) Quantitative table

iii) When a statistical method is applied on the data, then it is called:

(a) Raw data (b) Primary data

(c) Secondary data (d) Group data

iv) Ungrouped data is also called:

(a) Raw data (b) Qualitative data

(c) Grouped (d) Ungroup data

v) A pie diagram is also called:

(a) Rectangle (b) Circle (c) Triangle (d) Square

vi) A sector diagram is called:

(a) Bar diagram (b) Pie diagram

(c) Graph (d) Circle diagram

vii) In pie diagram the sector of a circles is obtained by:

(a) $\frac{\text{Component}}{\text{Total}} \times 360^\circ$ (b) $\frac{\text{Component}}{\text{Total}} \times 360^\circ$

(c) $\frac{\text{Component}}{\text{Total}} \times 260^\circ$ (d) $\frac{\text{Total}}{\text{Component}} \times 260^\circ$

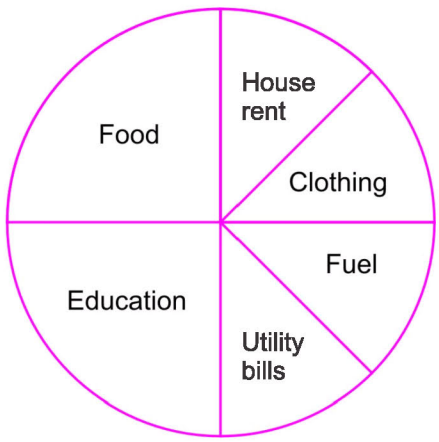
Q2. Daily wages of 15 labours in a building under construction are given below. State wether it is group or ungroup data.

200, 240, 300, 240, 250, 240, 300, 250, 240, 250, 200, 300, 260, 280, 200, 260

Q3: Make a bar graph vertically and horizontally of the data given below:

Age	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16
No. of Students	28	42	54	48	44	50

Q4. Write the fraction for different expenditures given in the following pie graph.



SUMMARY UNIT 13

- Data is a set of information and facts which is represented in the form of figures.
- The data which provides us information about individuals is called ungrouped data.
- The data which provides us information about groups is called the grouped data.
- A graph is a drawing that shows the relationship between numbers and quantities.
- A graph with horizontal bars is called horizontal bar graph and vertical bars is called vertical bar graph.
- A pie graph is used for inter-comparison of a data.

- رشوت لینے اور دینے والا دونوں جہنمی ہیں۔
- بدعنوانی اور رشوت ستانی ضمیر کی موت ہے۔
- بدعنوانی ملکی ترقی کی راہ میں سب سے بڑی رکاوٹ ہے۔
- بدعنوانی اخلاقی دیوالیہ پن کو جنم دیتی ہے۔
- بدعنوانی سے خود بھی بچیں اور دوسروں کو بھی روکیں۔

قومی احتساب بیورو بلوچستان

قومی ترانہ

پاک سَرزمین شادباد کِشورِ حَسین شادباد
تُو نِشانِ عَزمِ عالی شان اَرض پاکِستان
مرکزِ یقین شادباد
پاک سَرزمین کا نِظام قُوّتِ اُخُوّتِ عوام
قوم، مُلک، سَلطنت پائِندہ تابِندہ باد
شادباد منزلِ مُراد
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